Behavioral Health Crisis Care: Moving Towards Less Dependence on the Emergency Department

By

Henry Colangelo

A Master's Paper submitted to the faculty of
the University of North Carolina at Chapel Hill
in partial fulfillment of the requirements for
the degree of Master of Public Health in
the Public Health Leadership Program

Chapel Hill

2014

Advisor: Anthony Viera, MD, MPH

Date

Second Reader: Beat Steiner, MD, MPH

Date

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Master's Paper Abstract

Behavioral health care in the United States underwent a significant transformation in the latter half of the 20th century with a mass movement towards deinstitutionalization. Since then, we have seen community mental health services struggle to adequately care for the growing number of individuals with serious mental illness and substance abuse. As a result, emergency departments have shouldered a large proportion of the increased need for behavioral health services. In many communities, the ED may be the only place that an individual in crisis can go to for psychiatric evaluation at all hours of the day. With the recent passage of health reform and a focus on studying innovative care models, new behavioral health facilities that provide an array of services have begun to emerge. These novel facilities aim to be an alternative to the emergency room for individuals in mental health or substance abuse crisis. The purpose of this Master's Paper is to explore the setting of psychiatric emergency care and its relationship to the emergency department, as well as report on the experience of a novel psychiatric crisis and assessment facility in Wake County, North Carolina.

The first part of this paper is a systematic review of the literature on interventions or strategies for reducing patient transfers from psychiatric crisis centers to the ED, experiences with ED transfers in other settings, and the process of "medical clearance" of psychiatric patients in emergency settings. The review demonstrated that there is a significant gap in the literature pertaining to patient transfers from psychiatric crisis centers to the ED. In addition, a majority of the reviewed studies on "medical clearance" of psychiatric patients suggested that routine laboratory testing is unnecessary and may be overused. Furthermore, they acknowledged the need for more prospective studies of medical clearance protocols for this patient population. Following the systematic literature review, this paper continues with an original manuscript that presents the results of a descriptive study of individuals who presented to the Wakebrook Crisis and Assessment facility and were subsequently transferred to a

medical ED. The results of this study demonstrated an overall downward trend in ED transfer rate since the initiation of a co-located primary care team but also identified a subpopulation of potentially avoidable transfers that occurred. This study is unique in that it describes a population of individuals who presented to a psychiatric crisis center but were later seen in a medical ED for either medical or psychiatric reasons. While it is a preliminary descriptive analysis, it provides a path for future research into the effectiveness of these novel facilities in preventing unnecessary ED visits and improving patient outcomes.

The Conundrum of "Medical Clearance" and Patient Transfers in Emergency Psychiatry: A Systematic Literature Review

Abstract

The widespread use of emergency departments for assessment and treatment of mental health and substance abuse problems has been a growing problem over the past few decades. Community-based psychiatric crisis centers act as an alternative to emergency departments, but patients may still be transferred to a higher level of care in the emergency department for "medical clearance." The objectives of this review are to examine the literature on patient transfers from psychiatric settings to the ED and the process of "medical clearance" of patients with psychiatric complaints in emergency settings. A third objective of examining ED transfers from nursing homes was also defined in order to draw parallels with the behavioral health setting. Using MeSH terms, I searched PubMed/MEDLINE for three distinct groups of literature: studies of interventions or strategies to reduce patient transfers from psychiatric crisis centers to the ED, studies of "medical clearance" of patients in psychiatric or substance abuse crisis, and studies examining patient transfers from nursing homes to the ED. Articles were included for review as long as they adequately addressed the study questions and were published in English after 1990. One reviewer abstracted results and assessed the overall quality of the included articles. Quality grades were based on study design, sample size, internal validity and generalizability. The three initial search strategies combined returned 128 articles, of which 21 were included for full review. The search returned no relevant articles specifically addressing patient transfers from psychiatric crisis centers to the ED. A majority of the studies on "medical clearance" concluded that routine laboratory testing of patients presenting with psychiatric complaints should be reserved for certain "high-risk" populations. The studies of patient transfers from nursing homes to the ED were mostly qualitative in design and identified a wide range of factors, from staffing issues to poor communication, which contributed to transfers.

Most of the studies in this review were limited by their retrospective design, small sample size and questionable generalizability. Overall, there is an unmet need for larger, prospective studies of “medical clearance” in this patient population that focus on longer-term outcomes. This review also identified a gap in the literature pertaining to the subset of patients who present to psychiatric crisis centers and are subsequently transferred to the ED. More observational studies are needed in order to better describe this population and identify areas for improvement and mitigation of unnecessary transfers.

Introduction

Overcrowding of emergency departments is an increasing problem in the U.S. health care system, and emergency department (ED) visits related to mental health or substance abuse (MHSA) conditions account for a substantial proportion of all ED visits. In 2007, around 12.5% (12 million) of all ED visits nationwide were MHSA-related and more than a third of those visits had substance abuse or mental health conditions listed as the primary diagnosis (1). This issue has become particularly apparent in North Carolina, where the number of state-operated psychiatric beds has decreased substantially over the past decade and patients are often "boarded" for days in a hospital until an inpatient psychiatric bed becomes available (2). In the first half of 2010, over 3,000 individuals in NC were wait-listed for inpatient beds at state-operated psychiatric hospitals with an average wait time of 2.6 days. Just over 200 of those individuals waited 7 days or longer for admission (3). The consequences of ED overcrowding are numerous and include increased costs, decreased quality of care and greatly extended wait times for patients.

The NC Department of Health and Human Services (DHHS), Division of Mental Health, Developmental Disabilities and Substance Abuse Services (MH/DD/SAS) recently released an action plan to reduce to number of individuals with mental illness, developmental disabilities or substance abuse disorders entering the ED and to reduce these individuals' length of stay in the ED (4). These recommendations include increasing the role of 24-hour Facility-Based Crisis Centers, working with law enforcement, increasing accountability of first responders and using non-ED resources for medical clearance evaluations of individuals in MHSA crisis (4).

As health systems work to minimize the impact of patients with MHSA-related conditions on overcrowded emergency departments, efficient and effective methods for medical clearance of these patients will be crucial. Emergency Medical Services (EMS) will also play a central role in triaging patients in the field and transporting those with less concern for medical emergencies

to specialized MHSA crisis facilities instead of the ED. The goal of this review is to understand methods for the medical clearance of MHSA patients in multiple settings, examine strategies used successfully in other populations to mitigate ED transfers, and identify important gaps in the literature. It will also help inform future interventions involving crisis centers and EMS to reduce the number of patients who unnecessarily end up in the ED.

Methods

I first examined the peer-reviewed literature for prior studies of interventions or strategies to reduce ED transfers of patients from MHSA crisis centers. An initial search of the PubMed/MEDLINE database was performed using the following search strategy and Medical Subject Heading (MeSH) terms: (psychiatric emergency services [MeSH] OR "crisis center*" OR "crisis assessment") AND (transfer* OR patient transfer [MeSH]). The search was limited to articles originally published in English after 1990. Articles were included only if they specifically addressed the transfer of patients from MHSA crisis centers to the ED. Given my expectation that there are few prior studies of interventions in this particular setting, I employed additional search strategies to fully explore the literature surrounding effective medical clearance and evaluation of MHSA patients.

A secondary search was performed to identify strategies of medical clearance of patients in psychiatric and/or substance abuse-related crisis that have been used in ED or EMS settings. The search strategy involved querying the PubMed/MEDLINE database with the following search headings: (mental disorders [MeSH] OR substance-related disorders [MeSH]) AND “medical clearance” AND (emergency department [MeSH] OR emergency medical services [MeSH]). Articles were limited to those published in English after 1990 and included expert opinion, professional society guidelines and studies of effectiveness. Additionally, I examined

references listed in the “related citations” feature of PubMed and hand searched reference lists for other pertinent articles.

In order to fully investigate potential strategies for preventing unnecessary ED transfers, I also searched the literature for studies examining ED transfers in other settings, with a specific focus on the nursing home population. Parallels can be drawn between the patient population seen in behavioral health crisis centers and that of nursing facilities. Altered mental status, including delirium and dementia, can be a common occurrence among individuals transferred from nursing facilities to the ED. I searched MEDLINE database using the following medical subject heading (MeSH) terms in PubMed: nursing home, emergency department and patient transfer. Articles were limited to those published in English after 1990 that specifically addressed appropriateness of transfers, interventions to reduce transfers or decision-making surrounding transfers.

Both qualitative and quantitative results were abstracted from the reviewed articles by a single reviewer and characteristics of the included studies were presented in tables. Qualitative results were primarily central themes that emerged during focus groups or interviews, while quantitative results varied from prevalence of lab testing, predictive value of certain components of medical clearance, and protocol adherence rates. Overall quality of the quantitative studies was assessed on the basis of study design, internal validity and generalizability. Evaluation of internal validity included assessing the potential for selection bias, measurement bias, and confounding. I used grades of poor, fair and good to assign overall quality ratings to each study. Good quality studies were prospective in design, had moderate to high internal validity, and demonstrated at least moderate generalizability. Quality of prior literature reviews was graded on the basis of 3 factors: description of search strategy, critical appraisal of the existing literature, and presentation of the evidence. Qualitative studies were judged on the basis of their methods and generalizability of their findings. Good quality reviews outlined a systematic

review strategy, clearly presented the evidence, and adequately appraised the evidence. Fair quality reviews may not have used a systematic search strategy or failed to adequately describe it and mentioned limitations of included articles without in-depth critical appraisal.

Results

Interventions/Strategies to Reduce ED Transfers from MHSA Crisis Centers

The initial search strategy returned 49 articles in PubMed/MEDLINE. After review of all article titles, I concluded that none of the 49 articles were directly relevant to the study question (Figure 1). Three articles reported on interventions in psychiatric emergency service settings, but did not specifically address patient transfers to the medical ED (5-7). One of these articles reported on a tele-health model for psychiatric emergencies in rural Australia (6), while the other two focused on decreasing admissions and length of stay for inpatient psychiatric care (5, 7).

"Medical Clearance" of Psychiatric Patients in ED or EMS Settings

The secondary search strategy focused on identifying current practices and the effectiveness of medical clearance of patients presenting with signs and symptoms of psychiatric illness in ED or EMS settings. This search strategy returned 23 articles in PubMed/MEDLINE, of which 9 met the inclusion criteria and were deemed relevant to the research question (Figure 2). I identified an additional 5 articles through the "related citations" feature of PubMed and hand searches of reference lists of included articles, although I was unable to access one of these (8). Furthermore, after consulting with an emergency physician, I reviewed an additional recommended article on medical evaluation and triage of the agitated patient presenting to the ED (9). Characteristics and quality grades for the 10 individual studies reviewed can be found in Table 1.

Two of the included articles were fair-quality reviews of the literature addressing medical clearance of psychiatric patients (10, 11). One of these reviews focuses on specific medical screening strategies used in the ED for psychiatric admissions (10), while the other provided a broader overview of the evidence base for medical clearance of psychiatric patients (11). Gregory and colleagues state that the purpose of medical screening in the ED is to identify 2 broad categories of individuals who cannot be safely or adequately treated in a psychiatric setting: those with a primary psychiatric disorder and serious medical comorbidity, and those with a primary medical condition or substance abuse disorder and secondary psychiatric symptoms (10). Zun defines medical clearance as "the initial medical evaluation of patients in the ED whose symptoms seem to be psychiatric, to determine whether serious underlying medical illness exists that would render admission to a psychiatric facility unsafe or inappropriate (11). There appears to be significant variability in how "medical clearance" is defined in the literature, with some suggesting that "medically stable" may be a more appropriate term given that patients are being evaluated at a single point in time and may still have an underlying medical issue despite being "medically cleared" in the ED (10-12).

While both reviews conclude that the process of "medical clearance" is highly variable, they also assert that extensive laboratory testing should be reserved for select populations of "high-risk" patients, namely those with new-onset psychiatric symptoms, signs of acute intoxication/overdose, the elderly and those with serious comorbid medical conditions (10, 11). Gregory and colleagues reported on the specific yield of various components of medical screening of psychiatric patients, concluding that the evidence supports routine history, physical examination, review of systems and vital signs for the purpose of medical screening. Conversely, they concluded that the overall evidence from 8 studies included in the review indicates a low yield for routine laboratory testing of psychiatric patients in the ED (10). Zun does not report on the yield of specific components of the medical screening process, but

instead focuses on the overall process of medical clearance and what it entails; she concludes that are no standard accepted protocols for medical clearance and that there is wide variation in the literature as to what laboratory tests should be performed (11). Additionally, she concludes that there is some evidence, though limited, that ED chart documentation of medical clearance is highly variable and often inadequate (11).

While both of these reviews provide a brief and informative overview of the literature surrounding medical clearance of psychiatric patients in the ED setting, they do have some important limitations. Importantly, the existing evidence base is limited and thus the reviews do not include many articles. In addition, the quality of the included studies was not a significant factor in the overall interpretation of the evidence. Zun referenced the U.S. Preventive Services Task Force and asserts that the articles included in her review fall under Level I (randomized controlled trial) through Level III (expert opinion) for level of evidence (11). In their review, Gregory and colleagues stated that no restrictions were placed on quality of publications for inclusion (10).

Three of the articles included in the present literature review (13-15) were also included in the review by Gregory and colleagues (10). For that reason, they will be covered in less detail here. Two of these articles were retrospective, observational analyses of psychiatric patients who came through a particular ED and underwent some form of medical clearance (13, 14). Korn and colleagues differentiated between patients presenting to the ED with isolated psychiatric complaints compared to those with both medical and psychiatric complaints, determining that patients with isolated psychiatric complaints and a history of psychiatric illness do not need ancillary testing (14). Olshaker and colleagues reported on the yield of various screening lab tests performed during the medical clearance process and concluded that a history and vital signs alone were able to identify most individuals with acute medical conditions (13). The third article, a prospective case series of 100 adults presenting to an ED with new

psychiatric symptoms, found that more than half of the patients were eventually found to have an organic etiology of their symptoms (15). The authors also concluded that non-lab evaluations such as history and physical exam are not sufficiently predictive to direct evaluation, recommending that medical clearance of adults presenting with new psychiatric symptoms consist of an extensive panel of tests including CT and lumbar puncture (15). While the results of this study depart significantly from the findings of others, it is important to note that it has many limitations. The study had very narrow inclusion criteria, and patients with any known psychiatric history were excluded. Additionally, despite acknowledging the low yield of screening with lumbar puncture, the authors argue that it should ideally be performed on "the vast majority of patients" presenting with new psychiatric symptoms (15).

Two newer studies included in this review also report on the yield of various components of medical clearance in the ED setting (16, 17). Fortu and colleagues performed a retrospective chart review of pediatric patients presenting to the ED with psychiatric complaints; they examined the yield of "medically indicated" urine toxicology screening (UTS) compared to "routine-driven" UTS (16). They found that among uncomplicated patients who received a "routine-driven" UTS there was no difference in the management or disposition of patients with a negative UTS compared to those with a positive UTS; from this, they concluded that pediatric patients with uncomplicated psychiatric complaints could be medically cleared without further laboratory testing (16). Janiak and Atteberry came to a similar conclusion in their retrospective chart review of 519 adult patients admitted to an inpatient psychiatric ward through the ED who received routine laboratory testing; with the exception of one patient in the study sample, they determined that none of the identified lab abnormalities would have resulted in a change of management in the ED (17). While both of these studies are fair-quality retrospective chart reviews, they have some important limitations. The study by Fortu and colleagues only examined the usefulness of UTS and did not consider other components of medical clearance

(16). The adult study by Janiak and Atteberry relied on the authors' subjective interpretation of how laboratory abnormalities could affect change of management in the ED (17).

Three studies addressed the wide variation in the medical clearance process across different providers and settings (18-20). Corl and colleagues (18) and Zun et al (20) examined variations in lab assessment during the medical clearance process. In a retrospective analysis of lab tests ordered for medical clearance of psychiatric patients in 10 adults ED's across Rhode Island, the number of lab tests differed significantly across the various facilities and individuals with a diagnosis of anxiety received significantly fewer lab tests compared to those with other psychiatric diagnoses (18). This study was limited by the fact that it only examined patients with private insurance, excluding individuals with Medicare, Medicaid and the uninsured. In addition, psychiatrists reported ordering more routine laboratory tests for psychiatric patients compared to emergency physicians (EPs) with the most common tests being UTS, alcohol screen and complete blood count (CBC), based on a survey mailed to providers in Illinois (20). In contrast to the ordering patterns for routine lab tests, this study also examined "required" lab tests and found that EPs and psychiatrists reported ordering similar sets; the authors hypothesized that this could be due to EPs interest in ensuring that patients are accepted for transfer to psychiatric facilities (20). A major limitation of this study is that it relies on self-reported data and includes far more EPs in the sample than psychiatrists.

Szpakowicz and Herd (19) conducted at retrospective analysis of adult patients who presented to the ED and had a disposition diagnosis of schizophrenia; they examined "completeness" of the physical exam based on 17 different components including vital signs, fingerstick blood glucose, oxygen saturation and more subjective aspects such as the full neurologic exam. Overall, they found that a complete set of vital signs were documented in only about half of the cases and younger patients in general had less complete physical

examinations documented (19). This study is limited by its examination of only one facility and the unclear effect of completeness of documentation on the study results.

Two articles included in this review reported on interventions to improve medical clearance protocols and triaging of psychiatric patients (21, 22). Cheney and colleagues (21) report on a good quality prospective observational study of a new EMS psychiatric center direct transfer protocol, which was designed to redirect uncomplicated psychiatric patients to a specialized facility instead of the ED. For patients who had a history of psychiatric illness, stable vital signs, no signs of medical illness and no obvious intoxication, this protocol only had a 4% failure rate; the vast majority of patients who met the criteria for direct transfer to the psychiatric emergency service (PES) were not subsequently transferred back to the medical ED (21). Limitations of this study include the singular focus on patients who were directly transported to the PES by EMS and the lack of extended follow-up of patients after discharge from the PES. A retrospective study of another triage tool with similar criteria also demonstrated that patients with a psychiatric complaint could be safely and effectively "cleared" by answering questions about vital signs, prior psychiatric history, mental status and other symptoms, with only 1% of patients returning to the ED for further evaluation (22). This study was limited by its retrospective design and lack of uniform application of the tool across all psychiatric patients presenting to the ED. For instance, the triage tool was not used to assess any patients with agitation, suspected overdose or other acute medical complaints (22).

Agitation is encountered quite frequently in both ED and PES settings. One recent article on medical evaluation and triage of the agitated patient was included after consultation with a practicing emergency physician (9). The American Academy of Emergency Psychiatry (AAEP) formed Project BETA (Best Practices in Evaluation and Treatment of Agitation) to produce evidence-based guidelines on the evaluation and treatment of agitation (23). As part of their study workgroup for Project BETA, Nordstrom and colleagues (9) developed an algorithm

that focuses first on determining the level of agitation and presence of any worrisome signs/symptoms in order to determine what level of care is needed. They advocate for differentiating between medical, toxic and psychiatric causes of agitation primarily through history, physical exam, mental status exam, vital signs (including fingerstick glucose and oxygen saturation) and directed laboratory tests (9). In addition, they recommend against routine laboratory testing in agitated patients presenting to the ED or PES (9). While the authors support these guidelines with some evidence, they are largely based on expert opinion. Additionally, there is no description of a review strategy used to identify supporting evidence in the literature.

Patient Transfers from Other Care Settings to the Emergency Department

As a third component of this review, I searched for articles that focused specifically on transfers from nursing homes to the ED. The search returned 56 articles and I determined that 9 were immediately relevant after reviewing titles and abstracts (Figure 3). I was unable to access two of these articles, both of which focused on appropriateness of patient transfers from nursing homes to the ED (24, 25). Characteristics and quality grades for the 7 studies reviewed can be found in Table 2.

Four of the articles reviewed were qualitative studies of decision-making and overall experiences surrounding patient transfers from nursing homes to the ED (26-29). Arendts and colleagues conducted focus groups and semi-structured interviews with nursing home residents, family members, nurses, general practitioners (GPs) and ED providers in order to identify ways to reduce ED transfers from nursing homes (26). Major themes identified in this study included staffing and skill mix, treatment options available, end-of-life decision making, communication and bureaucratic requirements. Specific areas for improvement voiced by study participants included the need for a 24/7 on-call assessment team, better staff-to-patient ratios, staff with broader scope of practice at night and better communication between nursing home and ED

staff when transfers do occur (26). The strengths of this study include that it encompassed a wide variety of different stakeholders in the focus groups and incorporated the patient perspective through semi-structured interviews with nursing home residents. Generalizability is limited, though, because it was conducted in Western Australia and the specific setting and source population were not described.

Jablonski and colleagues (27) also performed a qualitative study of transfer decision-making in the nursing home setting, but focused more on how transfer decisions are made and what influences the decision to transfer a resident to the ED. They first identified 16 different transfers across 3 nursing homes and conducted interviews with at least 2 "key informants" involved in each transfer; three major themes underlying the decision-making process that emerged after analysis were consensus, conflict and cogency (27). Conflict and cogency both emerged in transfers where at least two of the participants disagreed initially on the need for transfer to the ED, with cogency referring to "the ability or capacity to convince or persuade others" (27). Conflict revolved around issues such as a relative lack of diagnostic tools in the nursing home setting, differing interpretations of severity or acuity, and financial issues associated with ED stays and patient transport. Based on the interviews, the authors also concluded that nurses play a central role in transfer decision-making, particularly when there is a conflict among the parties involved (27). In contrast to other qualitative studies reviewed on this topic, this study included 3 different nursing homes from rural, suburban and urban settings, expanding generalizability. Some limitations include the relatively small sample of 16 transfers across the 3 nursing homes and the process for recruiting participants; researchers relied on nursing home employees to contact the resident or responsible party to obtain consent before they could make contact (27).

Two qualitative studies focused on residents' experiences with the transfer process itself and potential strategies to improve transitions between nursing homes and the ED (28, 29).

McCloskey (28) used an institutional ethnography (IE) approach to examine the experiences of Canadian nursing home residents who were transferred to the ED; she observed 24 transfers over the study period and interviewed nursing home practitioners, residents and ED personnel. The three main themes that emerged were the work of executing transfers, creating and exchanging resident information, and feeling guilt but not responsibility about how transfers occurred. Nurses were described as being the main decision-makers surrounding transfers, and while there was a mandatory continuity of care form for every patient transfer to the ED, there was a great deal of variation in how complete the form would be when sent to the ED; additionally, nursing home nurses overall felt that the presence of this form meant that it wasn't necessary to verbally communicate with ED staff (28). The author also identified a general lack of responsibility among the participants interviewed, with individuals in both ED and nursing home settings pointing to each other as being responsible for improving transfers (28). The IE approach used in this study allowed for a greater array of information since it involved stakeholder interviews as well as direct observation of the patient transfer process. This study is limited by its inclusion of only one particular nursing home in Canada and the reliance on nursing home staff to notify the investigator of an impending transfer; moreover, the investigator did not have access to charts or past medical history for any of the observed patient transfers.

Terrell and Miller also examined the patient transfer process and identified potential strategies for improving care transitions. They conducted two focus groups consisting of nursing home administrative staff, nurses, physicians, EMS directors, paramedics, ED nurses and physicians, and representatives from the local health department; the central theme was the need for more structure to support transitions between nursing homes and the ED (29). Some of the specific strategies identified by participants for improving structure included a 2-way transfer form for transfer to the ED and back to the nursing home, a bidirectional checklist for providers in both settings to complete before transferring the patient, and improved verbal

communication across both nursing home and ED settings. In addition, accountability at all levels was cited as in important component and verbal communication was felt to be crucial to any improvement in care transitions (29). This study provided a good overview of patient transfers from individuals who were knowledgeable about the subject, but did not include any patient perspectives. Other limitations include the non-random selection of participants and selection of an emergency physician as the focus group moderator, which could introduce bias.

One article focused on an intervention to educate nursing home nurses on efficient use of the ED (30). Mercer and Robinson (30) examined 50 consecutive records for patients who had been transferred to the ED and found that over half were for procedures such as PICC lines, blood transfusions and imaging. An education intervention was then designed and implemented by ED nurses to encourage nursing home staff to schedule procedures that were non-emergent for the following day instead of transferring patients to the ED; the intervention included cards with contact information for both the ED and hospital specialty services. The authors stated that no "unnecessary" admissions through the ED due to nursing home residents needed specialty services occurred during a 5 month period following the intervention (30). The interpretation of this is significantly limited by the lack of any statistical analysis and inclusion of only one hospital in Illinois.

Of the articles reviewed here, only one directly addressed "appropriateness" of patient transfers from nursing homes to the ED (31). Jones and colleagues (31) conducted a prospective, observational study at two hospital EDs to examine the appropriateness of transfers and the completeness of documentation sent with patients who were transferred. Appropriateness was determined for each transfer by the treating physician with defined criteria, and other data from the transfer form and nursing home documentation were reviewed; the authors reported that the majority of all transfers (77%) were considered appropriate. The most common reason for transfer given by the nursing home was a fall (12.3%), followed by altered

mental status (9.3%) (31). Additionally, there were significant shortcomings in the completeness of documentation provided by nursing homes during transfers; advance directives, immunizations, baseline mental status and functional abilities were some of the most common things not documented (31). Another finding of the study was that nursing home staff were unable to contact on-call physicians in about 12% of transfer cases (31). While this study provided a detailed descriptive analysis of patient transfers from nursing homes to the ED, it does have some limitations. Specifically, the ED physicians were not blinded to the study objectives when indicating appropriateness of transfer on the study form, which is a potential source of bias.

Finally, the editorial by Wong (32) broke down the factors contributing to nursing home transfer decisions into 3 main categories: physiologic determinants, functional determinants and psychosocial determinants. According to Wong (32), physiologic determinants include the nature and severity of medical diagnoses as well as presence of comorbidities; functional determinants include presence of cognitive impairment and ability to perform activities of daily living (ADLs); psychosocial determinants include family dynamics, presence of advance directives and nursing home resources. He also acknowledged that transferring nursing home residents to the ED is the status quo, and that there is a lot of room for innovation in the nursing home setting to curb transfers including medication management programs and acute care services on-site (“step-up” units) (32).

Discussion

The findings of this review demonstrate that there is still a fair amount of uncertainty regarding the “medical clearance” of psychiatric patients. While there are two fair-quality reviews of the subject that do agree on some major points (10, 11), there is still a lack of any

unified guidelines for medical clearance. The editorial by Reeves and colleagues reiterates that there is no meaningful consensus on the definition of medical clearance among psychiatric and medical providers (12).

Many articles, including the two reviews, do support routine laboratory testing as a part of medical clearance for certain "high-risk" populations such as those with new onset of psychiatric symptoms, signs or symptoms of overdose, serious medical comorbidities and the elderly (9-11, 13, 15). Only one of the studies reviewed recommended comprehensive routine laboratory testing for all patients presenting with psychiatric complaints, and there were several methodological issues that limit any substantive conclusions that can be drawn from the results (15). Both review articles focus on the importance of a thorough history, physical exam, mental status exam and vital signs in the medical clearance process (10, 11). The two articles published since these reviews on specific components of the medical clearance process both fall on the side of recommending against routine laboratory testing in patients with psychiatric complaints (16, 17). One limitation that most of the studies share is their retrospective design, which limits the conclusions that can be drawn; there is certainly a need for larger, prospective studies across multiple sites in order to develop solid, evidence-based guidelines for medical clearance in this patient population.

Importantly, I was not able to identify any studies that specifically focused on interventions to reduce patient transfers from psychiatric emergency services or crisis centers to the medical emergency department. Two studies of interventions in the medical clearance process both found that screening tools could be used safely and effectively in the ED and EMS settings, but their scope was relatively limited (21, 22). Standalone crisis centers that are open 24 hours a day, 7 days per week and serve as an alternative to the ED for individuals with psychiatric illness or substance abuse are a more recent phenomenon in behavioral health care. Psychiatric emergency services in general grew out of 3 major changes in behavioral health

care: deinstitutionalization of psychiatric patients, growth of community mental health services and growth of emergency medical services (33). Many psychiatric emergency services are housed within or adjacent to medical ED's (33), so it can be hypothesized that this is one reason why much of the previous literature does not specifically address transfer of patients to the medical ED. Larger prospective studies of screening tools in the ED and EMS settings, as well as in standalone PES and crisis center settings would provide a better evidence-base for interventions to reduce overall ED use by MHSA patients.

My review of the literature on patient transfers from nursing homes to the ED did reveal some interesting findings that could potentially be applied to the behavioral health setting. Many of the studies were qualitative in nature and focused on either transfer decision-making or the transfer process in general (27-29). One common theme that arose was the crucial role that nurses often play in making transfer decisions and handling the actual transfer process (27, 28). Nurses and mid-level providers also play a pivotal role in providing care in behavioral health facilities, and future qualitative research on ED transfers should be conducted in these settings. Other common themes in the literature surrounding reducing ED transfers or improving transfer processes included a need for greater physician presence in nursing homes, improved staff to patient ratios, more comprehensive documentation and better verbal communication between nursing home staff and ED staff (26, 28, 29, 31). The only study that reported on a nursing intervention to mitigate unnecessary ED transfers from nursing homes was methodologically weak (30).

This review clearly demonstrates that there is a need for more research on the transfer of patients from MHSA crisis centers to the ED. As these facilities are designed to prevent unnecessary ED visits by individuals with psychiatric complaints, it is crucial that future research focus on care provided in this setting. While the "medical clearance" process in general has a fairly weak evidence base, there is some consensus that routine laboratory testing for patients

with psychiatric complaints in the ED setting can be costly and unnecessary. More high-quality evidence is needed in order to create guidelines for effective, efficient and safe medical clearance practices in multiple care settings. The literature on patient transfers from nursing homes to the ED also provides important lessons for behavioral health facilities. There are likely many parallels with regard to nurses' scope of practice, communication issues and availability of higher levels of care. Qualitative studies focusing on similar issues should be conducted in MHSA crisis centers to identify areas for intervention.

References

1. Owens PL, Mutter R, Stocks C. Mental health and substance abuse-related emergency department visits among adults, 2007. HCUP statistical brief #92. Rockville, MD: Agency for Healthcare Research and Quality; 2010.

2. Vicario M. The "crisis" crisis: Emergency department use and community resources in north carolina's behavioral health crisis system. N C Med J. 2012 May-Jun;73(3):216-8.

3. Akland A, Akland G. State psychiatric hospital admission delays in north carolina: January-june 2010. National Alliance on Mental Illness (NAMI); 2010.

4. NC Divison of Mental Health, Developmental Disabilities and Substance Abuse Services. Emergency department length of stay action plan. NC Department of Health and Human Services; 2011.

5. Adesanya A. Impact of a crisis assessment and treatment service on admissions into an acute psychiatric unit. Australas Psychiatry. 2005 Jun;13(2):135-9.

6. Saurman E, Lyle D, Perkins D, Roberts R. Successful provision of emergency mental health care to rural and remote new south wales: An evaluation of the mental health emergency care-rural access program. Aust Health Rev. 2014 Feb;38(1):58-64.

7. Polevoi SK, Jewel Shim J, McCulloch CE, Grimes B, Govindarajan P. Marked reduction in length of stay for patients with psychiatric emergencies after implementation of a comanagement model. Acad Emerg Med. 2013 Apr;20(4):338-43.

8. Williams ER, Shepherd SM. Medical clearance of psychiatric patients. Emerg Med Clin North Am. 2000 May;18(2):185,98, vii.

9. Nordstrom K, Zun LS, Wilson MP, Md VS, Ng AT, Bregman B, et al. Medical evaluation and triage of the agitated patient: Consensus statement of the american association for emergency psychiatry project beta medical evaluation workgroup. West J Emerg Med. 2012 Feb;13(1):3-10.

10. Gregory RJ, Nihalani ND, Rodriguez E. Medical screening in the emergency department for psychiatric admissions: A procedural analysis. Gen Hosp Psychiatry. 2004 Sep-Oct;26(5):405-10.

11. Zun LS. Evidence-based evaluation of psychiatric patients. J Emerg Med. 2005 Jan;28(1):35-9.

12. Reeves RR, Perry CL, Burke RS. What does "medical clearance" for psychiatry really mean? J Psychosoc Nurs Ment Health Serv. 2010 Aug;48(8):2-4.

13. Olshaker JS, Browne B, Jerrard DA, Prendergast H, Stair TO. Medical clearance and screening of psychiatric patients in the emergency department. Acad Emerg Med. 1997 Feb;4(2):124-8.

14. Korn CS, Currier GW, Henderson SO. "Medical clearance" of psychiatric patients without medical complaints in the emergency department. J Emerg Med. 2000 Feb;18(2):173-6.

15. Henneman PL, Mendoza R, Lewis RJ. Prospective evaluation of emergency department medical clearance. Ann Emerg Med. 1994 Oct;24(4):672-7.

16. Fortu JM, Kim IK, Cooper A, Condra C, Lorenz DJ, Pierce MC. Psychiatric patients in the pediatric emergency department undergoing routine urine toxicology screens for medical clearance: Results and use. Pediatr Emerg Care. 2009 Jun;25(6):387-92.

17. Janiak BD, Atteberry S. Medical clearance of the psychiatric patient in the emergency department. J Emerg Med. 2012 Nov;43(5):866-70.

18. Corl K, Mello MJ, Baird J, Jagminas L, Siclari M, Kazim A. Variations in laboratory testing during medical clearance of psychiatric patients in the emergency department. Med Health R I. 2008 Nov;91(11):339-41.

19. Szpakowicz M, Herd A. "Medically cleared": How well are patients with psychiatric presentations examined by emergency physicians? J Emerg Med. 2008 Nov;35(4):369-72.

20. Zun LS, Hernandez R, Thompson R, Downey L. Comparison of EPs' and psychiatrists' laboratory assessment of psychiatric patients. Am J Emerg Med. 2004 May;22(3):175-80.

21. Cheney P, Haddock T, Sanchez L, Ernst A, Weiss S. Safety and compliance with an emergency medical service direct psychiatric center transport protocol. Am J Emerg Med. 2008 Sep;26(7):750-6.

22. Shah SJ, Fiorito M, McNamara RM. A screening tool to medically clear psychiatric patients in the emergency department. J Emerg Med. 2012 Nov;43(5):871-5.

23. Holloman GH,Jr, Zeller SL. Overview of project BETA: Best practices in evaluation and treatment of agitation. West J Emerg Med. 2012 Feb;13(1):1-2.

24. Bergman H, Clarfield AM. Appropriateness of patient transfer from a nursing home to an acute-care hospital: A study of emergency room visits and hospital admissions. J Am Geriatr Soc. 1991 Dec;39(12):1164-8.

25. Saliba D, Kington R, Buchanan J, Bell R, Wang M, Lee M, et al. Appropriateness of the decision to transfer nursing facility residents to the hospital. J Am Geriatr Soc. 2000 Feb;48(2):154-63.

26. Arendts G, Reibel T, Codde J, Frankel J. Can transfers from residential aged care facilities to the emergency department be avoided through improved primary care services? data from qualitative interviews. Australas J Ageing. 2010 Jun;29(2):61-5.

27. Jablonski RA, Utz SW, Steeves R, Gray DP. Decisions about transfer from nursing home to emergency department. J Nurs Scholarsh. 2007;39(3):266-72.

28. McCloskey RM. A qualitative study on the transfer of residents between a nursing home and an emergency department. J Am Geriatr Soc. 2011 Apr;59(4):717-24.

29. Terrell KM, Miller DK. Strategies to improve care transitions between nursing homes and emergency departments. J Am Med Dir Assoc. 2011 Oct;12(8):602-5.

30. Mercer S, Robinson S. Educating nursing home nurses on efficient use of the emergency department. J Emerg Nurs. 2008 Feb;34(1):74-6.

31. Jones JS, Dwyer PR, White LJ, Firman R. Patient transfer from nursing home to emergency department: Outcomes and policy implications. Acad Emerg Med. 1997 Sep;4(9):908-15.

32. Wong RY. Transferring nursing home residents to acute care hospital--to do or not to do, that is the question. J Am Med Dir Assoc. 2010 Jun;11(5):304-5.

33. Hillard JR. The past and future of psychiatric emergency services in the U.S. Hosp Community Psychiatry. 1994 Jun;45(6):541-3.

Tables & Figures

Figure 1. Search results for studies of interventions/strategies of reducing ED transfers from MHSA crisis centers

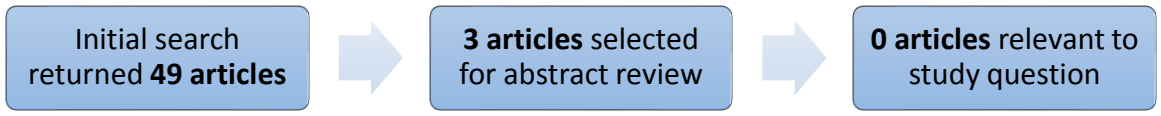

Figure 2. Search results for studies of "medical clearance" of psychiatric patients in ED/EMS settings

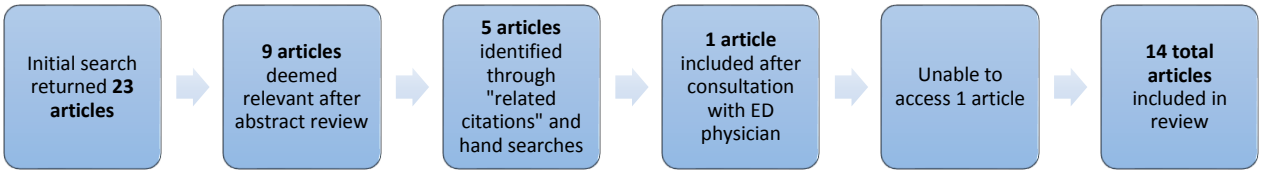

Figure 3. Search results for studies of patient transfers from nursing homes to the ED

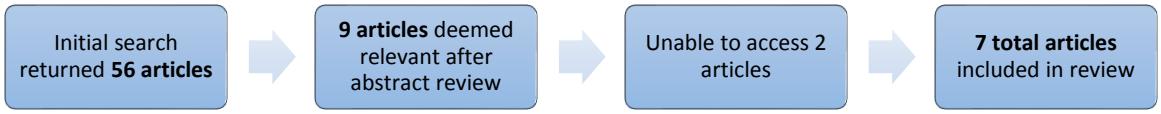

Table 1. Studies addressing “medical clearance” of psychiatric patients in ED/EMS settings

Study	Study Design	Sample	Setting	Outcomes measured	Results	Internal Validity	Generalizability	Overall Quality
Korn et al (2000)	Retrospective chart review	212 adult patients presenting with psych complaints	Urban teaching hospital ED	Initial complaint, med/psych history, vitals, exam findings, lab results, disposition	38% had isolated psych complaints, 62% had both med and psych complaints; Lab results “noncontributory” in all patients with isolated psych complaints	Moderate; one reviewer abstracted data from charts (measurement bias) No measurement of comorbidities/review of prior records	Moderate; conducted at large, urban trauma center Study period was only 5 months	Fair
Olshaker et al (1997)	Retrospective chart review	353 adult patients presenting with psych complaints	Urban teaching hospital ED	Proportion with medical conditions; sensitivities of history, physical exam, vital signs and lab testing for predicting medical conditions	19% had acute medical conditions; History had 94% sensitivity; Phys exam had 51% sensitivity; Lab studies had 20% sensitivity	Moderate; 4 unblinded ED physicians abstracted data from charts No review of prior medical records	Moderate; conducted at single urban ED Study period was only 2 months	Fair
Cheney et al (2008)	Prospective observational study	174 adult patients transported directly to PES	EMS/PES direct transfer protocol	Protocol noncompliance, failure rate, patient morbidity	29% noncompliance rate; 1 patient required hospitalization; Protocol failed for 5 patients	Moderate-High; All providers underwent protocol training EMS providers blinded to study purpose	Moderate; generalizable only to urban areas with similar access to PES and similar level of care	Good
Corl et al (2008)	Retrospective analysis of insurance database	2291 adult patients presenting with psych complaints	All 10 adult ED’s across a single state	Number of medical clearance tests received	Number of lab tests ordered varied significantly by hospital; Fewer lab tests for those with anxiety diagnosis	Moderate; Used insurance database for all data; Potential unmeasured confounders (only controlled for age and diagnosis)	Moderate; Sample included patients from 10 different ED’s but only used data from a single private insurer (excluded uninsured and Medicaid/Medicare)	Fair
Fortu et al (2009)	Retrospective chart review	652 children who received UTS in ED (“routine-driven” vs medically indicated)	Children’s hospital ED	Positive UTS results, ED disposition and management	51% had routine UTS; 68% of routine-driven group had neg UTS; No difference in dispo/management between pos and neg UTS	Moderate; Single unblinded reviewer; Potential unmeasured confounders	Low-Moderate; Only included children presenting to one ED; Did not examine other lab tests besides UTS	Fair

Study	Study Design	Sample	Setting	Outcomes measured	Results	Internal Validity	Generalizability	Overall Quality
Henneman et al (1994)	Prospective case series	100 adult patients presenting with new psych sx's	Urban teaching hospital ED	Positive findings in hx, physical, or lab testing; Diagnoses; Disposition; Utility of eval components	63 patients had organic etiology of sx's (38 had toxicologic etiologies and 25 had neuro cause); History had greatest utility (27% significant)	Low-Moderate; Large potential for measurement bias; No description of who reviewed charts	Low; Extensive exclusion criteria (obvious drug/alcohol intox or OD, known psych d/o, psych d/o with medical complaint, and suicidality)	Poor
Janiak et al (2012)	Retrospective chart review	519 adult patients admitted to psych inpatient service through ED	Urban teaching hospital	Lab abnormalities on admission; Changes in ED dispo or management	221 had positive UTS, 136 had anemia, 139 had hyperglycemia; Only 1 patient had admission lab abnormality that required change in ED management	Moderate; ED physicians not aware of study (blinded); 2 investigators subjectively determined if lab abnormalities required any change in management	Moderate; Large sample size and few exclusion criteria	Fair
Shah et al (2012)	Retrospective chart review	500 adult patients presenting with psych complaints and medically cleared with screening tool	Transfers from urban teaching hospital ED to psych crisis center	Additional lab or imaging studies performed; Disposition from crisis center	6 patients sent back to ED; 12 patients had further medical work-up;	Low-Moderate; Potential unequal application of screening tool by triage nurses; No follow-up of patients sent home or transferred to another facility	Moderate; Only included patients who were ultimately "cleared" and transferred to crisis center	Fair
Szpakowicz et al (2008)	Retrospective chart review	202 adult patients with ED diagnosis of schizophrenia	Urban teaching hospital ED in Canada	Proportion of patients with documented physical exam (17 components)	52% had complete vitals documented; Younger patients less likely to have documented vitals and exam	Moderate; Potential for measurement bias interpreting documentation;	Low-Moderate; Only examined schizophrenic patients at single ED	Fair
Zun et al (2004)	Mailed survey	507 ED physicians and 66 psychiatrists	Illinois ED physicians and psychiatrists	Routine lab tests ordered, required lab tests ordered; Costs of tests	Psychiatrists ordered more routine lab tests (for 11 of 16 tests)	Low; Large potential for measurement bias in survey responses	Low; Only included Illinois physicians; Surveys returned by only 50% of physicians	Poor

Table 2. Studies addressing transfer of patients from nursing homes to the ED

Study	Study Design	Sample	Setting	Outcomes measured	Results	Internal Validity	Generalizability	Overall Quality
Arendts et al (2010)	Qualitative; focus groups and semi-structured interviews	33 stakeholders (family members, care staff, nurses, managers, ED staff, GP's) in focus groups; Interviews with 9 nursing home residents	Australia; No further description of setting from which study sample was recruited	Major themes from interviews/focus groups	Inadequate staff to resident ratio; Need for 24/7 on-call assessment team; Improved communication between nursing home and ED	Moderate; Focus groups conducted by same independent facilitator and audio-recorded; Unclear how extensive qualitative analysis was	Moderate; Good representation of a variety of stakeholders but unclear how subjects recruited; Unclear how generalizable to U.S. setting	Fair
Jablonski et al (2007)	Qualitative; Hermeneutic phenomenology (interviews)	Stakeholders involved in 16 different ED transfers (nurses, family members, physicians, PA's, and nursing home residents)	3 nursing homes in Virginia	Major themes from interviews with individuals involved in transfer decision-making	Major themes: consensus, conflict, and cogency; Decisions to transfer residents usually reached by consensus; Nurses play central role	Moderate; Interviews conducted by single researcher; Minimum of 2 informant interviews per transfer	Moderate; Good representation of decision-makers; Small sample size and limited geographically	Fair
McCloskey (2011)	Qualitative; Institutional ethnography (observation of transfers and interviews)	24 transfers observed; interviews with ED and nursing home practitioners, residents	Single non-profit nursing home and ED in Canada	Major themes from observed transfers and practitioner/resident interviews	Major themes: work of executing transfers, creating/exchanging information, feelings of guilt/responsibility; Nurses main decision-makers; Physicians typically not present	Moderate-High; Data from observed transfers and stakeholder interviews; Single researcher; Inclusion of transfer dependent on nursing home notifying researcher	Moderate; Only examined transfers from one nursing home to one ED; Fairly large sample	Good

Study	Study Design	Sample	Setting	Outcomes measured	Results	Internal Validity	Generalizability	Overall Quality
Mercer et al (2008)	Retrospective chart review; evaluation of intervention	50 patients transferred from nursing home to ED	Single ED and multiple surrounding nursing homes	Reason for transfer, time of transfer, length of ED stay; Transfers occurring after nursing education intervention	26 transfers due to physician ordering hospital specialty services (i.e. G-tube, PICC); 20 transfers occurred between 4-10pm; No "unnecessary" transfers in month after intervention	Low; Very subjective interpretation of transfer reason; No measurement for potential confounders; No statistical analyses	Low; Study conducted by nurses at a single ED; No description of nursing homes that transfers came from	Poor
Terrell et al (2011)	Qualitative; focus groups	18 stakeholders (nursing home administrators, nurses, physicians, EMS directors, paramedics, ED nurses/physicians, and a DOH representative)	2 focus groups in Indianapolis, IN	Opinions, perceptions and insights of individuals involved in care transitions between nursing homes and ED's	Major themes: need for more structured care transitions; Standardized transfer forms; Transfer checklist; More accountability; Improved verbal communication	Moderate; Single moderator for focus groups; Qualitative analysis well-described; Concern that moderator (ED physician) could introduce bias	Moderate; Unclear how participants were recruited; No patient/family member representation	Fair
Jones et al (1997)	Prospective, observational study	709 nursing home residents who made 1,012 transfers to the ED	2 community hospital ED's in Midwest U.S.	Need for ambulance; Transfer "appropriateness"; Completeness of patient records sent by nursing home; Time of transfer; Reason for transfer; ED diagnoses	12.3% of transfers due to falls; 9.3% due to altered mental status; 45% subsequently admitted to hospital; 52% returned to nursing home after evaluation; 77% deemed "appropriate"	Moderate; Data abstractor blinded to study purpose; Multiple sources of data including ED records, transfer form, and physician questionnaire (ED physicians not blinded)	Moderate-Good; Large sample size and data from 2 different community hospital ED's; Unclear what level of care provided at nursing homes involved in transfers	Good

Emergency Department Transfers from a Novel, Community-Based Psychiatric Crisis and Assessment Unit: A Descriptive Analysis

Abstract

Community-based psychiatric emergency services (PES) play a vital role in providing crisis care to individuals with mental health and/or substance abuse complaints. They also serve as an important alternative to overcrowded emergency departments for this patient population. Wakebrook Crisis and Assessment Services (CAS) is a novel PES with a co-located primary care medical team. Some patients presenting to CAS are still subsequently transferred to the ED for various medical or psychiatric reasons. In order to examine the characteristics of these ED transfers more closely, we performed a descriptive, cross-sectional study of all patients who presented to the crisis center between August and December of 2013 and were subsequently transferred to a local ED. We examined the trend in ED transfer rates between August 2013, when the presence of the primary care team was relatively new, and March 2014, after the primary care team was well-established. Patients who presented to CAS during "off hours" (nights and weekends), when there is little or no primary care presence, were more likely to be transferred to the ED compared to those who arrived during weekday hours (8% vs 5%, p=0.027). Most transferred patients were either admitted under observation status (48%) or discharged home (21%) after an average stay of 10.1 hours in the ED. Of those transferred for any medical reason, a large proportion (26%) were eventually sent home from the ED. Overall ED transfer rates from the crisis center showed a significant downward trend between August 2013 and March 2014 (Figure 2). This study is unique in that it describes an important subpopulation of patients who presented to a novel psychiatric crisis center and were later transferred to the ED. The presence of a co-located primary care team at Wakebrook has likely played a significant role in mitigating ED transfers, but as evidenced by the high proportion of patients sent home from the ED, there are still some potentially avoidable transfers occurring.

Introduction

Serious mental illness and substance use disorders represent a substantial burden of disease worldwide. Accounting for almost 9 million years of life lost globally to premature mortality in 2010, mental health and substance abuse (MHSA) disorders were also the largest contributors to years lived with disability (1). In the United States, over one quarter of adults ages 18 and older suffer from mental illness or a substance use disorder in a given year (2). As overall disease burden continues to shift away from acute conditions and more towards chronic disease, MHSA conditions will be a growing part of that burden. With this increasing burden of MHSA conditions in the global population, additional resources will be needed to address the needs of patients living with these conditions. The evidence linking mental health and physical health has grown, and we better understand the need to address both aspects of health in order to improve outcomes for patients and populations (3).

A major component of improving care for the MHSA population involves preventing unnecessary emergency department (ED) visits and ensuring a stable source of crisis care in the community. Over the past few decades, the proportion of total ED visits related to MHSA conditions has been on the rise. This increase has been attributed to a number of factors including lack of insurance, decreased access to mental health resources and increased fragmentation of services under managed care (4). Between 1992 and 2001, the number of MHSA-related ED visits rose by 40% from 17 per 1,000 U.S. population to almost 24 per 1,000 U.S. population, with substance-related disorders being the most common diagnosis (4). This trend has continued through more recent years, with MHSA-conditions accounting for 12 million ED visits in 2007, representing about one in every eight visits (5). The consequences of increased MHSA-related ED use include worsening overcrowding of ED's, increased health care costs and decreased quality of care. The Institute of Medicine released a report in 2006 declaring that hospital-based emergency care is "at a breaking point" regarding overcrowding of

EDs, with many patients being “boarded” in the ED for 48 hours or more (6). This is especially problematic for individuals with MHSA conditions who present to the ED. A 2008 survey by the American College of Emergency Physicians found that “boarding” of psychiatric patients in the ED is an increasing problem that can significantly drain available resources in the ED (7). In addition to contributing to ED overcrowding, individuals presenting to the ED for MHSA-related chief complaints also spend a great deal of time simply waiting for a psychiatric bed in a nearby facility to become available. This issue has become particularly apparent in North Carolina, where the number of state-operated psychiatric beds has decreased substantially over the past decade and patients are often boarded for days in a hospital until an inpatient psychiatric bed becomes available (8). In the first half of 2010, over 3,000 individuals in NC were wait-listed for inpatient beds at state-operated psychiatric hospitals with an average wait time of 2.6 days. Just over 200 of those individuals waited 7 days or longer for admission (9).

As ED overcrowding continues to worsen, there has been a push to provide psychiatric crisis care in other settings in order to stem the disproportionate increase in MHSA-related ED visits. Psychiatric emergency services (PES) in general represent crisis care settings “that are able to deal with the full range of behavioral and psychiatric emergencies immediately;” in addition, these services must also be able to manage patients with limited decision-making capacity (10). The PES model can be contrasted with the traditional psychiatric consultation model in which behavioral health providers consult on patients who present to the medical ED with MHSA-related conditions (11). The PES model in general encompasses psychiatric services contained within medical ED settings, standalone PES facilities that offer extended observation, mobile PES, and psychiatric emergency residential facilities (10). PES contained within a medical ED is the most common setting, but there can be considerable variation in capability depending on size and staffing of the ED. On the other hand, standalone or “facility-based” PES typically provide more comprehensive crisis care with more adequate, specialized

staffing. In addition, facility-based PES often provide inpatient psychiatric care housed within the same setting (10). Mobile PES are unique in that they provide 24-hour psychiatric emergency care and meet patients in their own environment, allowing for a better sense of outside factors that may be contributing to a crisis (10). Indeed, studies have demonstrated the advantages of established PES compared to the traditional consultation model including more timely psychiatric evaluation, increased completion of mental status exams and decreased elopement (11).

Other new models of care for individuals living with mental illness and/or substance use disorders have recently started to emerge in order to further address some of the problems we currently face in the behavioral health care system. Co-location, or integration, of primary care with behavioral health and psychiatric care has become increasingly common in the provision of care for individuals with serious mental illness (SMI), which includes schizophrenia, schizoaffective and bipolar disorders (12). Care integration has also been identified by the Institute of Medicine as a crucial component of improving quality in behavioral health care (IOM). A randomized trial of integrated care at a Veterans Affairs (VA) mental health clinic demonstrated increased provision of preventive care services, improved overall health status, and a reduction in number of ED visits (13). Strategies to expand the scope of practice of paramedics also aim to reduce unnecessary ED visits by individuals with psychiatric complaints. Advanced Practice Paramedics (APP's) receive additional training in crisis intervention and are able to properly triage and transport patients directly to PES facilities, thus avoiding the ED (14).

There is a general lack of research on the role and effectiveness of new models of behavioral health care in mitigating MHSA-related ED visits (12, 15). The aim of this study was to examine the patterns of patient transfers from a PES to the medical ED, with a focus on identifying precipitants of transfers, characterizing ED visits of transferred patients, and describing their ultimate disposition from the ED. The results of this study contribute to both

quality improvement within the PES to mitigate unnecessary ED transfers as well as general knowledge regarding the role that community crisis centers play in emergency psychiatric care.

Methods

Setting

Wakebrook Campus is a novel behavioral health facility operated by UNC Health Care in collaboration with Wake County, NC. Wakebrook provides a spectrum of care including crisis and assessment services (CAS), an acute inpatient psychiatric unit, a residential facility-based crisis (FBC) unit and a residential addiction treatment center (ATC). An integrated primary care outpatient clinic for individuals with SMI is also slated to open later this year. The staff at Wakebrook consists primarily of behavioral health providers (psychiatrists, psychologists and social workers) working alongside primary care physicians and nurse practitioners in a "reverse co-location" model (16). The CAS arm of Wakebrook is a 24-hour PES designed to assist individuals in acute MHSA crisis who might otherwise end up in the ED by providing triage, assessment, counseling, access to medication, and referral to inpatient psychiatric hospitalization if necessary. Occasionally, patients are transferred from CAS to a local ED if it is felt that a higher level of care is needed.

ED Transfer Trends

In order to examine the overall trends in ED transfer rate over time, we first collected information from the CAS database on the total number of patients arriving to CAS by month and the number of patients transferred by month for the period from August 2013 to March 2014. We calculated the average number of individuals presenting to CAS each month and the average ED transfer rate over the 8 month period. We then plotted the total CAS arrivals and

ED transfer rates by month for this same time period to provide a visual representation of the trends.

Descriptive Study of CAS Patient Transfers

The second part of this study is a descriptive, cross-sectional study of individuals who presented to Wakebrook CAS between August and December of 2013 and were transferred to a local ED (WakeMed Raleigh, NC) for further care. Subjects were identified through a central database kept at CAS that lists patients who are transferred from CAS to the ED for any reason. From the list of transferred patients, we reviewed CAS records to determine the reason for transfer. Reason for transfer was coded by a two reviewers (HC and SC) as one of seven categories: somatic pain, chest pain, elevated blood pressure, safety (including suicidal ideation or self-harm), agitation/aggression, overdose, and other medical complaints. We also recorded demographic information including patient age, sex and insurance coverage, as well as day of transfer, time of transfer and original mode of arrival to CAS. In addition to reporting raw arrival and transfer times, we also created a categorical time of arrival variable with 4 groups: week days, week nights, weekend days and weekend nights. CAS arrivals occurring between 8am and 5pm on Monday through Friday were considered “week day” arrivals and those occurring during the day on Saturday or Sunday were “weekend day” arrivals. “Week night” arrivals consisted of those occurring at night on Monday through Thursday, while “weekend night” arrivals contained those that occurred on Friday, Saturday or Sunday night. Modes of arrival included self, law enforcement officer (LEO), emergency medical services (EMS), or both EMS and LEO. The EMS category includes Wake County APP’s who have an expanded scope of practice and receive advanced crisis intervention training. Some LEO’s also have additional crisis intervention training as well. Due to small sample size, we did not include separate categories for EMS or LEO’s with advanced training.

In addition to the review of CAS records, we also reviewed the ED visit and hospitalization records of patients who presented to CAS and were transferred to the ED during the study period. Information from the ED visit was abstracted by two reviewers (HC and RW) into multiple data fields for each corresponding transfer including ED chief complaint, presence or absence of abnormal vital signs, imaging studies, medications, final ED diagnoses, disposition from the ED, and time spent in the ED. Each reviewer abstracted data for separate sets of subjects using a standardized data dictionary that was developed jointly by the reviewers. ED chief complaint was recorded as a categorical variable with the same seven categories as reason for transfer in order to facilitate comparison between the two. Some patients had multiple ED chief complaints and fell into multiple categories, so we recorded both a primary and secondary chief complaint. We examined inter-rater agreement between CAS reason for transfer and primary ED chief complaint by calculating the Kappa statistic (17). Dichotomous indicator variables for each chief complaint were created in order to account for patients with multiple chief complaints. We reported vital signs as either "abnormal" or "normal" based on JNC-7 criteria for hypertensive emergencies and a Wake County EMS triage algorithm (18, 19). Patients who had a hypertensive emergency (systolic BP>180 or diastolic BP>120), hypotension (systolic BP<90), or heart rate abnormalities (HR>110 beats per minute or HR<50 beats per minute) were considered to have "abnormal" vital signs for the purposes of this study. We reported ED imaging studies as a dichotomous variable: receipt of CT, x-ray or other imaging study versus no imaging. Medications were also reported as a dichotomous variable (received or did not receive); patients who received any oral or IV prescription medications including sedatives/neuroleptics, pain medications, anti-hypertensives and antibiotics were considered to have received medications in the ED. We coded ED diagnoses as one of ten possible categories: substance abuse, overdose/intoxication, withdrawal, altered mental status/delirium, psychosis, mood disorder/suicidal ideation, suicidal behavior, aggressive behavior, acute medical problem or chronic medical problem. Again, some patients had more

than one ED diagnosis so dichotomous indicator variables were created for each diagnosis category to account for multiple diagnoses. Disposition from the ED was reported as either observation, inpatient, home, transfer to an inpatient psychiatric facility or departure against medical advice (AMA). We calculated total time spent in the ED from ED arrival and departure times captured in the ED visit record and reported it as a continuous variable in hours.

Statistical Analysis

In the initial analysis, we examined basic characteristics of all CAS arrivals and subsequent ED transfers including time of arrival, mode of arrival and time of transfer (if applicable). We constructed histograms of arrival time to CAS for all patients who presented as well as those who were eventually transferred to the ED. We also examined transfer rates by day of week as well as the distribution of transfer times for all CAS patients who were transferred. We used Pearson's chi-square test and Fisher's exact test to examine the relationship between CAS time of arrival, mode of arrival and ED transfer status (transferred or not transferred). This analysis was repeated with CAS time of arrival categorized as either "working hours" (8am-5pm Monday-Friday) or "off hours" (all other hours).

The secondary analysis involved describing the transfer and ED visit characteristics of the sample of transferred patients including time of transfer, reason for transfer, ED chief complaint, imaging studies performed, medications given, ED diagnoses, disposition, and time spent in the ED. Demographic characteristics including mean age, gender distribution and payer distribution were examined for all transferred patients and stratified by mode of arrival to CAS and reason for transfer from CAS. We calculated proportions to examine the relationship between mode of arrival to CAS and time of day of transfer, reason for transfer, and other ED visit characteristics. We also stratified ED visit characteristics by listed reason for transfer from CAS. Again, we used proportions to examine the relationship between reason for transfer and the other categorical variables included in the analysis. Fisher's exact test was used to

determine statistical significance for categorical variables and one-way analysis of variance (ANOVA) was used to examine the differences in mean time spent in ED.

For the final analysis, we categorized reason for transfer as either medical or psychiatric: the "psychiatric" group consisted of all transfers that had originally been classified as agitation- or safety-related, while the "medical" group would be comprised of transfers belonging to any of the other 5 categories (high BP, chest pain, somatic pain, overdose/withdrawal symptoms or other medical problems). We reported the proportion of patients who had abnormal vitals, imaging or medications, as well as the ED disposition and total time spent in the ED for these two broad categories of reason for transfer. Statistical significance of the differences between the two groups was determined using Fisher's exact test for categorical variables and a 2-sample t test to compare mean time spent in the ED. We performed all statistical analyses using Microsoft Excel (Redmond, WA) and STATA 13 (College Station, TX).

This study was approved by the University of North Carolina at Chapel Hill (Chapel Hill, NC) Institutional Review Board (Biomedical IRB Study #: 14-0159) and the WakeMed Institutional Review Board (Raleigh, NC).

Results

Overall Trend in ED Transfer Rate

Between August 2013 and March 2014, an average of 391 patients per month presented to CAS. During this time period, the total number of patients presenting to CAS remained fairly constant (Figure 1). The average ED transfer rate over this same period was 5.6% with a maximum transfer rate of 7.3% in November 2013 and a low of 3.47% in March 2014. Additionally, there was a notable downward trend in transfer rate over time (Figure 2).

Time of Arrival, Mode of Arrival and Transfer Status of All Patients Presenting to CAS

During the study period from August 2013 to December 2014 a total of 1,930 individuals presented to Wakebrook Crisis and Assessment Services for evaluation. Of those presenting to CAS, 126 patients (6.5%) were subsequently transferred from CAS to the emergency department. Monday was the busiest day for CAS arrivals during the study period, with 344 total arrivals. ED transfer rates ranged from 5% on Thursdays to 9% on Sundays, but overall there was no statistically significant difference in transfer rate by day of the week. Arrivals to CAS occurred throughout the day, with the majority occurring in the afternoon/early evening (Figure 3). The median arrival time to CAS was 2:33pm. Limited only to patients who were ultimately transferred to the ED, the distribution of arrival times to CAS was similar to that of all CAS arrivals (Figure 4). The distribution of transfer times for patients transferred to the ED was concentrated in the evening and early morning hours (Figure 5).

For the four categories of CAS arrival time (week day, week night, weekend day and weekend night), ED transfer rate ranged from 5% on week days to 9% on weekend days (Table 1) but the difference was not statistically significant (p=0.14). Week nights had the second highest proportion of ED transfers, with 42 patients transferred out of 543 who presented to CAS during those times. When time of arrival to CAS was categorized into “working hours” and “off hours”, the ED transfer rate was statistically significantly higher for individuals who presented to CAS during “off hours” compared to those who presented to CAS during “working hours” (Table 2).

There were substantial differences in the absolute number of CAS arrivals across the 4 modes of arrival, with the vast majority self-presenting and only a small fraction brought in by EMS or EMS in conjunction with law enforcement (Table 3). The ED transfer rate ranged from 6% for self-presenting patients to 12% for patients arriving via EMS, but this difference was not

statistically significant and the absolute number of EMS patients who were ultimately transferred to the ED was quite small (n=6).

Demographic Characteristics of Transferred Patients

A total of 126 patients were identified as having been transferred to the ED during the study period. Five patients who were transferred to other facilities were excluded from the chart review and analysis, as we had access to UNC and WakeMed records only. The results presented here are for 121 patients transferred to the ED during the study period. Full ED records were missing for 9 patients, so some transfer characteristics reported here apply only to the 112 patients with complete records. The average age of the overall study sample was 38.9 ± 15.4 years, 35% of the subjects were female, 21% had public health insurance coverage, 14% had private coverage and 64% were uninsured (Table 4). When stratified by mode of arrival to CAS, there were no significant differences in demographic characteristics with the exception of a higher proportion of individuals with no insurance coverage (75%) in the group who self-presented to CAS. Stratified by reason for transfer, there were more notable differences in demographic characteristics (Table 5). Patients transferred for high blood pressure or chest pain were older on average while those transferred for agitation or safety reasons were younger on average. Additionally, individuals transferred for safety reasons were more likely to be female and those transferred for pain were far more likely to be uninsured.

ED Visit Characteristics of Transferred Patients

Characteristics Overall and by Mode of Arrival to CAS

Using data abstracted from the ED visit records, we described the transfer characteristics for the overall sample as well as stratified by mode of arrival to CAS (Table 6). Almost half of the transfers occurred on week nights (43%), with the second most common transfer time being weekend nights. The most common reason for transfer to the ED was “other medical,” which represented a third of the overall study sample. The next most common

reasons for transfer were overdose or withdrawal symptoms (19%) and agitation (17%). There were no statistically significant differences in time of transfer or reason for transfer across the 3 categories of mode of arrival. Overall, the most common ED chief complaint was "other medical" (40%), with OD/withdrawal (20%) and safety (19%) representing the next most common chief complaints. There were statistically significant differences across the 3 modes of arrival with regards to the proportion of individuals with "other medical" or "safety" chief complaints. Only 16% of the sample had grossly abnormal vital signs upon initial presentation to the ED, 36% underwent imaging studies in the ED and 71% received medications. There were no statistically significant differences in services received in the ED across the mode of arrival groups. The most common ED diagnoses among transferred patients were acute medical conditions, mood or psychotic disorders, and suicidality. A significantly higher proportion of patients brought to CAS by law enforcement or EMS were given a diagnosis of suicidality in the ED compared to the prevalence of suicidality as a diagnosis among the overall study sample. With regards to ED disposition, the majority of transferred patients (48%) were admitted to the hospital under "observation" status. In addition, a substantial proportion of patients (21%) were discharged home from the ED. The mean time spent in the ED was 10.1 ± 6.0 hours for the overall sample. ED disposition and total time spent in the ED did not vary substantially by initial mode of arrival to CAS.

Characteristics by Reason for Transfer

We also examined transfer and ED visit characteristics stratified by reason for transfer (Table 7). There were no notable differences in time of transfer across the 7 categories of reason for transfer with the exception of a greater proportion of week night transfers occurring for patients for safety, other medical reasons, and overdose or withdrawal; these differences were not statistically significant. The inter-rater agreement between reason for transfer as recorded by CAS staff and primary ED chief complaint was 60.2% with a Kappa statistic of

k=0.5, indicating a “moderate” level of agreement (17). There were statistically significant differences in abnormal initial vitals, imaging tests and medications across the various reasons for transfer. Those transferred for high blood pressure (75%) or agitation (25%) had the greatest proportions of patients with grossly abnormal vitals upon presentation to the ED. Individuals transferred for somatic pain (63%), chest pain (60%) or other medical problems (50%) received imaging studies in the ED more frequently than those transferred for other reasons. The majority of transferred patients received medications in the ED, with pain (88%), high blood pressure (100%) and agitation (90%) representing the groups with the highest proportions of patients receiving medications.

ED diagnosis differed significantly by CAS reason for transfer for 3 out of 10 diagnosis groups: acute medical, chronic medical and OD/intoxication. The somatic pain (63%), chest pain (60%) and other medical (65%) reason for transfer groups had the highest percentages of patients who received an acute medical diagnosis in the ED. High blood pressure (38%) was the transfer reason that contained the greatest proportion of patients who had a diagnosis of a chronic medical condition in the ED. Interestingly, even though the group transferred for OD/withdrawal symptoms contained the highest percentage of patients with a diagnosis of OD/intoxication, 50% of this group were not given a diagnosis of OD/intoxication. There were some differences in ED disposition across the 7 reason for transfer categories, though not statistically significant. Individuals transferred for reasons including other medical (33%) and OD/withdrawal (26%) were more often discharged home from the ED compared to the other groups. Those transferred for pain (75%), agitation (70%) and safety (60%) were more commonly admitted under observation status. Patients who were transferred for safety reasons spent the longest time in the ED on average (14.1 ± 12.6 hours), but the differences were not statistically significant.

Characteristics by Medical versus Psychiatric Reason for Transfer

When CAS reason for transfer was grouped into two broad categories, medical and psychiatric, there were no statistically significant differences in the proportions of patients who had grossly abnormal vitals, underwent imaging tests or received medications (Table 8). Patients transferred for medical reasons were far more likely to be sent home from the ED compared to patients transferred for psychiatric reasons (26% vs 7%), while those transferred for psychiatric reasons were more likely to be admitted to the hospital under observation status compared to the medical reason group (67% vs 41%). Of patients who were transferred for medical reasons and did not received medications in the ED, a substantial proportion (33%) were discharged home. Total time spent in the ED was about 3 hours greater among patients transferred for psychiatric reasons compared to those transferred for medical reasons, and the difference was statistically significant (p=0.009).

Discussion

This preliminary, descriptive study took a multi-focal approach to describing the transfer of patients from a novel psychiatric crisis and assessment unit to the ED. It accomplished this through examination of overall transfer trends, cross-sectional analysis of a population of patients who presented to the crisis center between August and December of 2013, and expanded chart review and analysis of a subset of these patients who were transferred to a local ED.

The chart review and cross-sectional analysis of patients who were transferred from CAS to the WakeMed ED provided some insight into the precipitants and outcomes of patient transfers. Overall, a majority of the patients who were transferred from CAS to the ED were eventually admitted to the hospital under observation status. Many of these individuals were most likely being held in the hospital while waiting for an inpatient psychiatric bed to open up at

another facility. Only a small proportion of transferred patients had grossly abnormal vitals in the ED and an even smaller fraction were admitted as inpatients, suggesting that most transfers were not due to severe medical conditions. We were interested in trying to differentiate between “unavoidable” transfers and “potentially avoidable” transfers, and the high proportion of transfers for “other medical” reasons represents a subpopulation that warrants further examination. Of the “other medical” transfers, a substantial proportion were sent home from the ED and only a small fraction had grossly abnormal vital signs upon arrival to the ED, indicating that this indeed could be a population of “potentially avoidable” transfers. On the other hand, ED transfers secondary to agitation or safety reasons can be thought of as “unavoidable.” Due to restrictions on the level of care provided, CAS cannot administer forced medications or use restraints for patients with severe agitation or safety concerns, necessitating immediate transfer to a higher level of care. Future interventions to increase the level of care provided at CAS could limit transfers for these reasons.

The majority of the transfers in our study occurred during week nights or weekend nights, which suggests that medical staffing during these times may be a contributing factor. Consultation with emergency physicians is available during night and weekend hours, but the presence of on-site medical staff is limited at those times. To further quantify the effect of provider availability on ED transfer rate, longer-term prospective studies of interventions to enhance provider presence or facilitate improved on-call consultation are needed.

We had expected that patients brought to CAS by EMS would be less likely to be transferred to the ED due to the triaging capabilities of EMT’s and APP’s. APP’s have the ability to determine which patients need to be transported directly to the ED and which have a lower acuity and can be safely managed at a crisis center such as CAS (14). While our study showed that patients arriving by EMS had a higher rate of transfer to the ED, the results were not statistically significant and interpretation is severely limited by the low absolute number of

patients who arrived via EMS. A follow-up study with a larger sample of patients brought in by EMS would be able to better characterize how the presence of APP's relates to the likelihood of subsequent transfer to the ED.

Another interesting finding from our results was the relatively weak correlation between CAS reason for transfer and the primary ED chief complaint. Even though the inter-rater agreement was in the "moderate" range, there were still many instances where the listed reason for transfer differed from the chief complaint upon arrival to the ED. This highlights potential problems with communication between the crisis center and the ED at the time of transfer. The large number of patients eventually sent home from the ED also lends support to the idea that there may be communication gaps during care transitions. As has been done in the nursing home setting, qualitative studies of transfer decision-making and interventions to improve communication during transitions in care should be implemented in the PES setting.

The results clearly demonstrated a significant downward trend in the overall ED transfer rate from Wakebrook CAS through March 2014 while the total number of arrivals remained constant. Wakebrook has had a co-located primary care team to provide acute medical care to patients since undergoing management changes in early 2013. While we could not demonstrate causality in this study, the timeline of increased primary care presence at the facility corresponds well to the substantial observed decrease in ED transfer rates from CAS over an 8 month period. We believe most of the downward trend in overall ED transfer rate from CAS stems from fewer transfers occurring during week days secondary to the presence of the primary care team. This finding bolsters the argument that co-location and integrated care may be effective strategies in preventing unnecessary ED utilization for behavioral health issues. Recent health care reform under the Affordable Care Act (ACA) promotes increased uptake of these innovative models through a variety of mechanisms (20). Prospective studies

with long term follow-up and a greater array of outcomes are needed to fully gauge the effect that these strategies have not only on individual outcomes but also overall cost and quality.

This study does have some important limitations including a small sample size, lack of prospective follow-up of transferred patients, and potential measurement bias in the abstraction of data during chart reviews due to the non-blinded status of the reviewer. The small sample size particularly limits the interpretation of analyses involving mode of arrival since only a very small number of patients arrived to the crisis center via EMS during the study period and the absolute number of EMS patients transferred to the ED was also quite small. Because this study was observational and retrospective, we were unable to determine any causal contributors to an increased likelihood of ED transfer. In addition, while there were two reviewers who abstracted data from ED visit records, each record was only seen by one reviewer so there may be bias in how each reviewer interpreted information in the records. We attempted to control for this by creating a data dictionary to be used while abstracting information from the charts into the database.

In conclusion, we found that ED transfers from a psychiatric crisis and assessment unit fell considerably during the period from August 2013 to March 2014, and we believe the presence of a co-located primary care team at this facility played an important role in reducing the transfer rate. In addition, our findings demonstrate that there is a subset of transfers for medical reasons that may be avoidable. Future research should aim to better differentiate avoidable and unavoidable transfers from PES settings, evaluate new models of behavioral health care such as reverse co-location, and include prospective follow-up of patients after transfer.

References

1. Whiteford HA, Degenhardt L, Rehm J, Baxter AJ, Ferrari AJ, Erskine HE, et al. Global burden of disease attributable to mental and substance use disorders: Findings from the global burden of disease study 2010. Lancet. 2013 Nov 9;382(9904):1575-86.

2. Kessler RC, Chiu WT, Demler O, Merikangas KR, Walters EE. Prevalence, severity, and comorbidity of 12-month DSM-IV disorders in the national comorbidity survey replication. Arch Gen Psychiatry. 2005 Jun;62(6):617-27.

3. Moussavi S, Chatterji S, Verdes E, Tandon A, Patel V, Ustun B. Depression, chronic diseases, and decrements in health: Results from the world health surveys. Lancet. 2007 Sep 8;370(9590):851-8.

4. Larkin GL, Claassen CA, Emond JA, Pelletier AJ, Camargo CA. Trends in U.S. emergency department visits for mental health conditions, 1992 to 2001. Psychiatr Serv. 2005 Jun;56(6):671-7.

5. Owens PL, Mutter R, Stocks C. Mental health and substance abuse-related emergency department visits among adults, 2007. HCUP statistical brief #92. Rockville, MD: Agency for Healthcare Research and Quality; 2010.

6. Institute of Medicine. Hospital-based emergency care: At the breaking point. Washington, D.C.: National Academies Press; 2006.

7. American College of Emergency Physicians. ACEP psychiatric and substance abuse survey 2008. ACEP; .

8. Vicario M. The "crisis" crisis: Emergency department use and community resources in north carolina's behavioral health crisis system. N C Med J. 2012 May-Jun;73(3):216-8.

9. Akland A, Akland G. State psychiatric hospital admission delays in north carolina: January-june 2010. National Alliance on Mental Illness (NAMI); 2010.

10. Allen MH, Forster P, Zealberg J, Currier G. Report and recommendations regarding psychiatric emergency and crisis services: A review and model program descriptions. American Psychiatric Association; 2002.

11. Woo BK, Chan VT, Ghobrial N, Sevilla CC. Comparison of two models for delivery of services in psychiatric emergencies. Gen Hosp Psychiatry. 2007 Nov-Dec;29(6):489-91.

12. Reilly S, Planner C, Gask L, Hann M, Knowles S, Druss B, et al. Collaborative care approaches for people with severe mental illness. Cochrane Database Syst Rev. 2013 Nov 4;11:CD009531.

13. Druss BG, Rohrbaugh RM, Levinson CM, Rosenheck RA. Integrated medical care for patients with serious psychiatric illness: A randomized trial. Arch Gen Psychiatry. 2001 Sep;58(9):861-8.

14. Berry J. Community health programs create niche for EMS. JEMS. 2012(August 2012).

15. Carey TS, Crotty KA, Morrissey JP, Jonas DE, Thaker S, Ellis AR, et al. Future research needs for evaluating the integration of mental health and substance abuse treatment with primary care. J Psychiatr Pract. 2013 Sep;19(5):345-59.

16. Collins C, Hewson DL, Munger R, Wade T. Evolving models of behavioral health integration in primary care. New York, NY: Milbank Memorial Fund; 2010.

17. Landis JR, Koch GG. The measurement of observer agreement for categorical data. Biometrics. 1977 Mar;33(1):159-74.

18. Chobanian AV, Bakris GL, Black HR, Cushman WC, Green LA, Izzo JL,Jr, et al. The seventh report of the joint national committee on prevention, detection, evaluation, and treatment of high blood pressure: The JNC 7 report. JAMA. 2003 May 21;289(19):2560-72.

19. Wake County EMS System. Protocol 11: Well person check. In press 2013.

20. Mechanic D. Seizing opportunities under the affordable care act for transforming the mental and behavioral health system. Health Aff (Millwood). 2012 Feb;31(2):376-82.

Tables & Figures

Figure 1. Total Number of Patients Presenting to CAS by Month

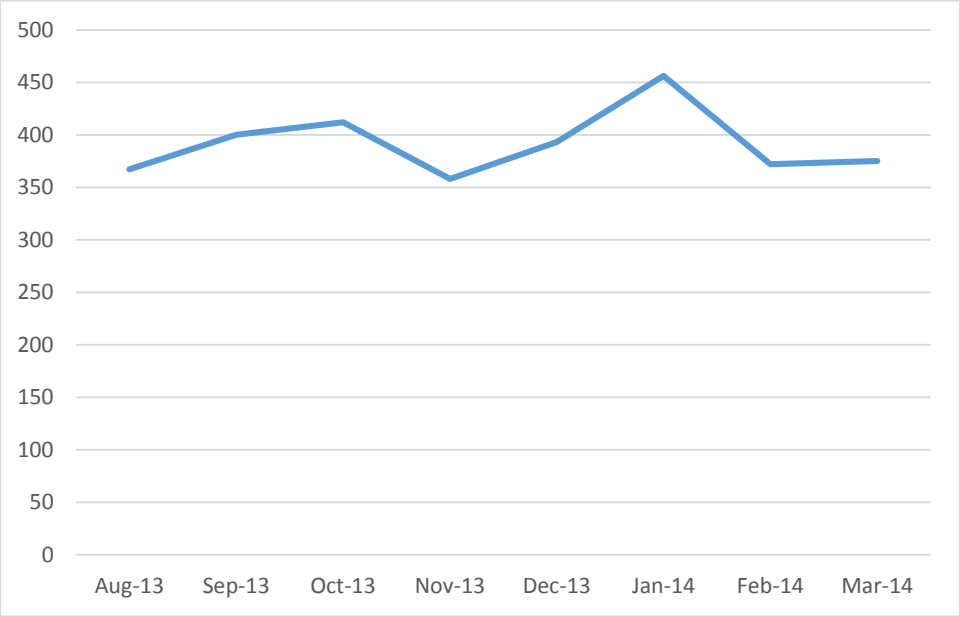

Figure 2. ED Transfer Rate from CAS by Month

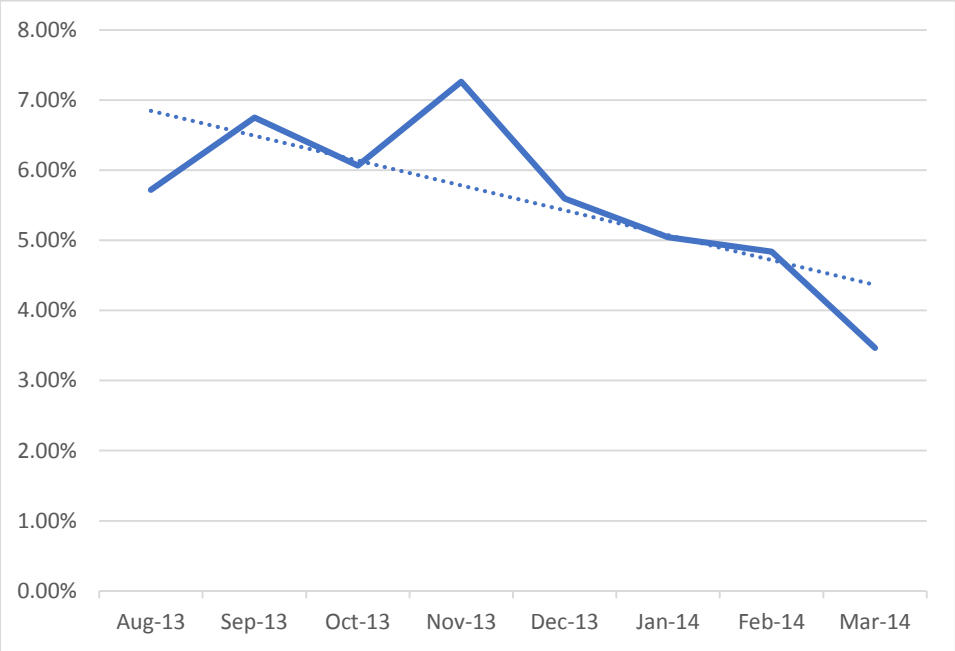

Figure 3. Distribution of Arrival Times to CAS for All Patients

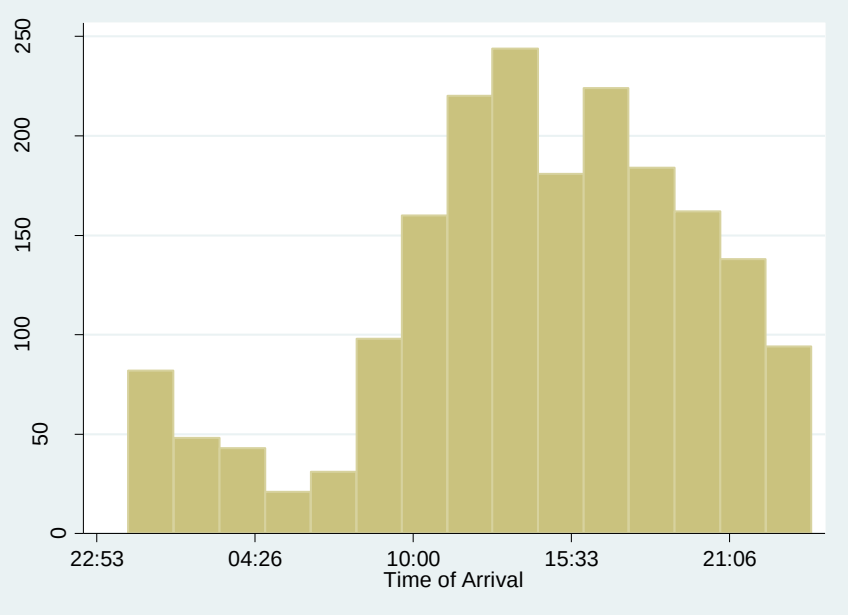

Figure 4. Distribution of Arrival Times to CAS for Transferred Patients

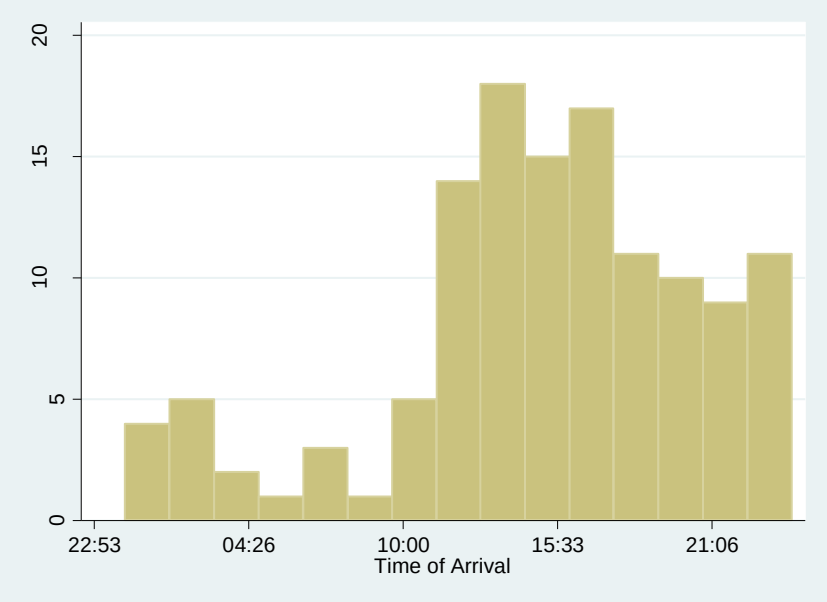

Figure 5. Distribution of Transfer Times from CAS for Transferred Patients

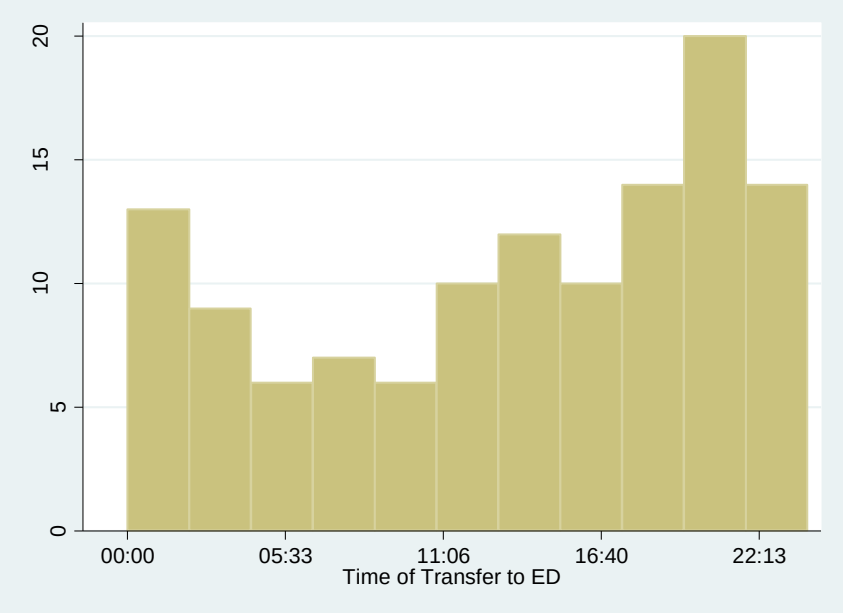

Table 1. Total Arrivals to CAS and Percent Transferred to ED by Time of Arrival to CAS

	Week Day	Week Night	Weekend Day	Weekend Night	
Total CAS Arrivals	857	543	186	344	
% Transferred (n)	5 (44)	8 (42)	9 (16)	7 (24)	p=0.14[a]

[a]Pearson's chi-square test

Table 2. Total Arrivals to CAS and Percent Transferred to ED by Time of Arrival in Two Categories (Working Hours versus Off Hours)

	Working Hours (8a-5p M-F)	Off Hours (all other times)	
Total CAS Arrivals	857	1073	
% Transferred (n)	5 (44)	8 (82)	p=0.027[a,#]

[a]Pearson's chi-square test
[#]statistically significant at p<0.05

Table 3. Total Arrivals to CAS and Percent Transferred to ED by Mode of Arrival to CAS

	Self	Law Enforcement	EMS	EMS/Law Enforcement	
Total CAS Arrivals	999	507	49	8	
% Transferred (n)	6 (56)	8 (42)	12 (6)	0	p=0.07[a]

[a]Fisher's exact test

Table 4. Demographic Characteristics of Study Sample Overall and by Mode of Arrival to CAS

	Mean (SD) or Percent (n)			
	Overall (n=121)	Self (n=52)	Law Enforcement (n=42)	EMS (n=6)
Age (years)	39.2 (16.0)	41.1 (14.2)	34.2 (14.7)	38.2 (15.3)
% Female	35 (n=42)	33 (n=17)	33 (n=14)	33 (n=2)
% Public Insurance	21 (n=26)	13 (n=7)	19 (n=8)	33 (n=2)
% Private Insurance	14 (n=17)	12 (n=6)	21 (n=9)	17 (n=1)
% Uninsured	64 (n=78)	75 (n=39)	60 (n=25)	50 (n=3)

Table 5. Demographic Characteristics of Study Sample by Reason for Transfer

	Mean (SD) or Percent (n)						
	Pain (n=8)	High BP (n=9)	Chest Pain (n=10)	Safety (n=10)	Agitation (n=21)	Overdose/ Withdrawal (n=23)	Other Medical (n=40)
Age (years)	38.9 (15.4)	52.3 (14.8)	45.3 (14.8)	30.7 (9.8)	33.7 (16.2)	36.0 (16.7)	41.6 (15.4)
% Female	13 (n=1)	33 (n=3)	10 (n=1)	60 (n=6)	19 (n=4)	39 (n=9)	45 (18)
% Public Insurance	0	22 (n=2)	40 (n=4)	50 (n=5)	14 (n=3)	13 (n=3)	23 (n=9)
% Private Insurance	13 (n=1)	0	0	10 (n=1)	24 (n=5)	22 (n=5)	13 (n=5)
% Uninsured	88 (n=7)	78 (n=7)	60 (n=6)	40 (n=4)	62 (n=13)	65 (n=15)	65 (n=26)

Table 6. Transfer Characteristics Overall and by CAS Mode of Arrival

	Percent (n) or Mean (SD)				
	Overall (n=121)	Self (n=52)	Law Enforcement (n=42)	EMS (n=6)	
Time of Transfer					p=0.35
% Week day	19 (23)	21 (11)	10 (4)	33 (2)	
% Weekend day	13 (16)	15 (8)	10 (4)	0	
% Week night	43 (52)	44 (23)	48 (20)	33 (2)	
% Weekend night	25 (30)	19 (10)	33 (14)	33 (2)	
CAS Reason for Transfer					p=0.44
% Agitation	17 (21)	10 (5)	29 (12)	17 (1)	
% Chest pain	8 (10)	10 (5)	7 (3)	0	
% High BP	7 (9)	10 (5)	2 (1)	0	
% Other medical	33 (40)	37 (19)	33 (14)	50 (3)	
% OD/withdrawal	19 (23)	19 (10)	21 (9)	17 (1)	
% Pain	7 (8)	10 (5)	2 (1)	0	
% Safety	8 (10)	6 (3)	5 (2)	17 (1)	
ED Chief Complaint*					
% Agitation	17 (19)	12 (6)	25 (10)	0	p=0.28
% Chest pain	5 (6)	8 (4)	3 (1)	0	p=0.50
% High BP	5 (6)	10 (5)	0	0	p=0.09
% Other medical	40 (45)	41 (20)	33 (13)	100 (4)	p=0.031[#]
% OD/withdrawal	20 (23)	22 (11)	20 (8)	0	p=0.76
% Pain	12 (14)	12 (6)	15 (6)	0	p=0.86
% Safety	19 (22)	6 (3)	30 (12)	0	p=0.008[#]
% Abnormal Initial ED Vitals	16 (18)	16 (8)	15 (6)	25 (1)	p=0.79
% Underwent Imaging in ED	36 (40)	40 (19)	28 (11)	25 (1)	p=0.51
% Given Medications in ED	71 (79)	73 (35)	68 (27)	100 (4)	p=0.45
ED Diagnosis*					
% Aggressive behavior	8 (9)	8 (4)	13 (5)	0	p=0.82
% AMS/delirium	5 (5)	8 (4)	0	0	p=0.27
% Acute medical	39 (43)	42 (20)	35 (14)	75 (3)	p=0.36
% Chronic medical	11 (12)	10 (5)	10 (4)	0	p=1.00
% Mood/psychotic disorder	37 (41)	35 (17)	32 (13)	50 (2)	p=0.75
% OD/intoxication	18 (20)	15 (7)	23 (9)	0	p=0.49
% Substance abuse	18 (20)	21 (10)	13 (5)	0	p=0.47
% Suicidality	29 (32)	19 (9)	40 (16)	50 (2)	p=0.043[#]
% Withdrawal	5 (5)	6(3)	3 (1)	0	p=0.69
Disposition					p=0.33
% Home	21 (24)	26 (13)	23 (9)	0	
% Inpatient admission	9 (10)	14 (7)	5 (2)	0	
% Left AMA	4 (5)	4 (2)	3 (1)	20 (1)	
% Observation admission	48 (55)	42 (21)	45 (18)	40 (2)	
% Transfer to inpatient psych	18 (21)	14 (7)	25 (10)	40 (2)	
Time in ED (hours)	10.1 (6.0)	10.1 (7.2)	10.0 (5.4)	10.3 (3.0)	p=0.99

*proportions are not cumulative; some subjects had more than one chief complaint or diagnosis; dichotomous indicator variables used for statistical tests

[a]Fisher's exact test used to examine differences in proportions; one-way analysis of variance (ANOVA) used to examine differences in continuous variables (Time in ED)

[#]statistically significant at p<0.05

Table 7. Transfer Characteristics by CAS Reason for Transfer

	Percent (n) or Mean (SD)							
	Pain (n=8)	High BP (n=9)	Chest Pain (n=10)	Safety (n=10)	Agitation (n=21)	Overdose/Withdrawal (n=23)	Other Medical (n=40)	
Time of Transfer								p=0.41
% Week day	25 (2)	11 (1)	0 (0)	0 (0)	19 (4)	26 (6)	25 (10)	
% Weekend day	13 (1)	22 (2)	40 (4)	10 (1)	14 (3)	9 (2)	8 (3)	
% Week night	25 (2)	33 (3)	40 (4)	50 (5)	33 (7)	48 (11)	50 (20)	
% Weekend night	38 (3)	33 (3)	20 (2)	40 (4)	33 (7)	40 (4)	18 (7)	
ED Chief Complaint*								
% Agitation	13 (1)	13 (1)	0 (0)	30 (3)	60 (12)	0 (0)	6 (2)	
% Chest pain	0 (0)	0 (0)	50 (5)	0 (0)	0 (0)	5 (1)	0 (0)	
% High BP	0 (0)	63 (5)	10 (1)	0 (0)	0 (0)	0 (0)	0 (0)	
% Other medical	25 (2)	13 (1)	40 (4)	30 (3)	35 (7)	14 (3)	71 (25)	
% OD/withdrawal	0 (0)	13 (1)	0 (0)	20 (2)	0 (0)	77 (17)	9 (3)	
% Pain	75 (6)	0 (0)	0 (0)	20 (2)	0 (0)	0 (0)	17 (6)	
% Safety	50 (4)	13 (1)	40 (4)	30 (3)	10 (2)	18 (4)	11 (4)	
% Abnormal Initial ED Vitals	0 (0)	75 (6)	10 (1)	10 (1)	25 (5)	9 (2)	9 (3)	p=0.002[#]
% Underwent Imaging in ED	63 (5)	13 (1)	60 (6)	20 (2)	30 (6)	14 (3)	50 (17)	p=0.012[#]
% Given Medications in ED	88 (7)	100 (8)	80 (8)	60 (6)	90 (18)	45 (10)	65 (22)	p=0.011[#]
ED Diagnosis*								
% Aggressive behavior	13 (1)	0 (0)	0 (0)	22 (2)	20 (4)	5 (1)	3 (1)	p=0.12
% AMS/delirium	0 (0)	0 (0)	0 (0)	0 (0)	10 (2)	5 (1)	6 (2)	p=0.94
% Acute medical	63 (5)	25 (2)	60 (6)	22 (2)	15 (3)	14 (3)	65 (22)	p<0.000[#]
% Chronic medical	25 (2)	38 (3)	10 (1)	22 (2)	0 (0)	9 (2)	6 (2)	p=0.032[#]
% Mood/psychotic disorder	50 (4)	38 (3)	30 (3)	11 (1)	65 (13)	27 (6)	32 (11)	p=0.09
% OD/intoxication	13 (1)	0 (0)	10 (1)	22 (2)	10 (2)	50 (11)	9 (3)	p=0.005[#]
% Substance abuse	0 (0)	25 (2)	20 (2)	11 (1)	0 (0)	27 (6)	26 (9)	p=0.08
% Suicidality	38 (3)	25 (2)	50 (5)	56 (5)	15 (3)	32 (7)	21 (7)	p=0.12
% Withdrawal	0 (0)	13 (1)	10 (1)	0 (0)	0 (0)	5 (1)	6 (2)	p=0.58
Disposition								
% Home	13 (1)	13 (1)	20 (2)	10 (1)	5 (1)	26 (6)	33 (12)	
% Inpatient admission	0 (0)	13 (1)	20 (2)	0 (0)	5 (1)	9 (2)	11 (4)	
% Left AMA	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	9 (2)	8 (3)	
% Observation admission	75 (6)	50 (4)	40 (4)	60 (6)	70 (14)	43 (10)	31 (11)	
% Transfer to inpatient psych	13 (1)	25 (2)	20 (2)	30 (3)	20 (4)	13 (3)	17 (6)	
Time in ED (hours)	9.8 (5.1)	11.0 (5.2)	9.9 (4.1)	14.1 (12.6)	11.8 (5.3)	9.1 (4.6)	8.6 (4.8)	p=0.17

*proportions are not cumulative; some subjects had more than one chief complaint or diagnosis; dichotomous indicator variables used for statistical tests

[a]Fisher's exact test used to examine differences in proportions; one-way analysis of variance (ANOVA) used to examine differences in continuous variables (Time in ED)

[#]statistically significant at p<0.05

Table 8. Transfer Characteristics by CAS Reason for Transfer in Two Categories

	Percent (n) or Mean (SD)		
	Medical Reason (n=90)	Psychiatric Reason (n=31)	
% Abnormal Initial ED Vitals	14 (12)	20 (6)	p=0.56
% Underwent Imaging in ED	39 (32)	27 (8)	p=0.27
% Given Medications in ED	67 (55)	80 (24)	p=0.24
Disposition			p=0.029[#]
% Home	26 (22)	7 (2)	
% Inpatient admission	11 (9)	3 (1)	
% Left AMA	6 (5)	0	
% Observation admission	41 (35)	67 (20)	
% Transfer to inpatient psych	16 (14)	23 (7)	
Time in ED (hours)	9.2 (4.7)	12.5 (8.3)	p=0.009[#]

[a]Fisher's exact test used to examine differences in proportions; 2-sample t test used to examine differences in continuous variables (Time in ED)
[#]statistically significant at p<0.05

Acknowledgments

I would like to thank the following individuals for their dedication and assistance on this important project:

Rachel Weiner (chart reviews and data analysis)
Dr. Beat Steiner, Dept. of Family Medicine (Master's Paper Second Reader, advising and support)
Dr. Seth Glickman, Dept. of Emergency Medicine (advising and support)
Dr. Anthony Viera, Dept. of Family Medicine (Master's Paper Advisor)
Dr. Sandy Clark, Dept. of Family Medicine (assistance with Wakebrook data collection)
Dr. Jeff Williams (WakeMed representative/sponsor)